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a polymer arranged in a manner which causes a portion of the polymer to deflect in response to a change in electric field, wherein a portion of the polymer is elastically pre-strained by a factor in the range of about 1.5 times to 50 times the original area.

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7. (Once Amended) The transducer of claim 6 wherein the polymer has a dielectric constant between about 2 and about 20.

Please ADD Claims 53-59 as follows:

53. (New) The transducer of claim 24 wherein the polymer has a dielectric constant between about 2 and about 20.

54. (New) The transducer of claim 24 wherein the polymer comprises one of a silicone rubber and an acrylic.

55. (New) The transducer of claim 24 wherein the polymer has a thickness between about 1 micrometer and 2 millimeters.

56. (New) The transducer of claim 24 wherein the polymer has an elastic modulus below about 100 MPa.

57. (New) The transducer of claim 24 wherein the portion of the polymer deflects out of the plane of the polymer in response to the change in electric field.

58. (New) The transducer of claim 24 further comprising a stiff member attached to a portion of the polymer.

59. (New) The transducer of claim 24 wherein the transducer is included in an artificial muscle.

REMARKS

Claims 1-52 were pending in the present application. Claims 9, 18-22 and 27-52 were withdrawn by the Examiner from consideration. Claims 1-8, 11-17, and 23-26 are rejected. Claims

10 is objected to. Claims 1 and 7 have been amended without prejudice to further prosecution. Claims 53-59 have been added. Applicants respectfully request reconsideration of the rejections set forth in this Office Action in light of the following remarks.

Applicants thank the Examiner for the courtesy extended during the personal interviews with Applicants' representative on September 16 and 18, 2002. During these interviews, several electroactive polymer samples were shown, electroactive polymer progress was discussed and demonstrated via numerous videos, and the rejections under 35 U.S.C. §102 and §103 were discussed.

Independent claim 1 has been amended to recite structural limitations that clarify the pre-strain of the present invention. Namely, the claims recite "wherein a portion of the polymer is elastically pre-strained by a factor in the range of about 1.5 times to 50 times the original area". Applicants note that this limitation was already included in dependent claim 7 as filed; and is supported in the Specification (see page 10, line 29 to page 11, line 3, for example).

Applicants also acknowledge allowability of claim 10 if rewritten in independent form, but believe all pending claims to now be allowable.

Rejections Under 35 U.S.C. § 102(b) and 103(a)

Claims 1, 5, 6, 8, 11-17, 20 and 23 are rejected under 35 U.S.C. section 102(b) as being unpatentable over Pelrine et al. "Electrostriction of Polymer Films for Microactuators". Applicants respectfully traverse. Claims 2-4, 7, and 24-26 are rejected under 35 U.S.C. §103(a) as being unpatentable over Pelrine et al. "Electrostriction of Polymer Films for Microactuators". Applicants respectfully traverse.

Independent claim 1 now recites "a polymer arranged in a manner which causes a portion of the polymer to deflect in response to a change in electric field, wherein a portion of the polymer is elastically pre-strained by a factor in the range of about 1.5 times to 50 times the original area". It is respectfully submitted that the prior art fails to teach or suggest such a limitation and polymer as recited in independent claim 1.

Independent claim 24 recites “a polymer arranged in a manner which causes a portion of the polymer to deflect in response to a change in electric field provided by the at least two electrodes, wherein the portion deflects with a maximum linear strain between about 50 percent and about 215 percent in response to the change in electric field”. Polymers that provide such deflections are not taught or suggested by the prior art. Thus, it is respectfully submitted that no combination of the prior art suggests such a limitation and polymer as recited in independent claim 24.

Accordingly, for at least these reasons, it is respectfully submitted that independent claims 1 and 24 are not taught or suggested by the art of record and are patentable.

Dependent claims 9 and 18-22 have been withdrawn from consideration by the Examiner. Applicants submit that dependent claims 9 and 18-22 include all the limitations of independent claim 1 and are therefore allowable for at least the reasons with respect to independent claim 1; and respectfully request that these claims be examined with independent claim 1. New claims have been added to provide various limitations of independent claim 24. No new matter has been added.

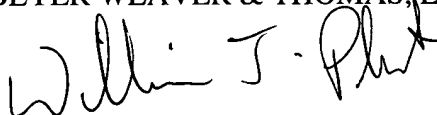
Claims 2-23, 25-26, and 53-59 each depend either directly from independent claims 1 and 24, respectively, and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to the independent claims. Further, the dependent claims recite additional elements which when taken in the context of the claimed invention further patentably distinguish the art of record.

Withdrawal of the rejection under 35 USC §102(b) is therefore respectfully requested.

Conclusion

In view of the foregoing, Applicant believes that all pending claims are allowable and respectfully request a Notice of Allowance from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the number set out below. If any fees are due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account 50-0388 (Order No. SRIIP020).

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP



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Limited Recognition under 37 C.F.R. §10.9(b)

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